

REMARKS

Status of the claims:

With the above amendments, claims 41, 54 and 68 have been amended. Claims 6-21, 45-46, and 54-66 have been previously withdrawn. Support for the amendment to claim 41 can be found in the specification at page 4. Support for the amendment for claim 54 comes from claim 41. Support for the amendment to claim 68 can be found in the specification at page 11. No new matter has been added by way of the amendments. Thus, claims 41-44, 52 and 67-68 are pending and ready for further action on the merits.

Rejoinder

Applicants respectfully request that the Examiner rejoin the method claims once the product claims are found allowable in light of the holding in *In re Ochiai*, 71 F.3d 1565, 37 USPQ2d 1127 (Fed. Cir. 1995), and *In re Brouwer*, 77 F.3d 422, 37 USPQ2d 1663 (Fed. Cir. 1996). Moreover, Applicants respectfully request that the Examiner examine the product by process claims as they are of the same scope as the product claims that are currently being examined. In particular, Applicants respectfully request that the Examiner examine claim 54 and claims dependent therefrom.

Information Disclosure Statement

Applicants thank the Examiner for pointing out that references cited in the specification but not submitted in an IDS are not considered by the Examiner. Applicants are in the process of procuring the references to submit in an IDS.

Rejections Under 35 U.S.C. § 112

The Examiner has rejected claim 68 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The Examiner noted that the claim was drawn to a food product comprising colonies of *Nostoc* that comprise phycoproteins, which the Examiner stated was not supported by the specification. Applicants have amended claim 68 to recite *Nostoc* colonies comprising phycobiliproteins. Support for *Nostoc* colonies containing elevated amounts of phycobiliproteins can be found in the specification at page 11. Therefore, claim 68, as currently amended, complies with the written description requirement of 35 U.S.C. § 112. Withdrawal of the rejection is respectfully requested.

Rejections Under 35 U.S.C. § 102(b)

The Examiner has rejected claims 41 and 52 under 35 U.S.C. § 102(b) as allegedly being anticipated by Qiu *et al.* (J. of Applied Phycology, 2002). Applicants traverse.

The Examiner states that Qiu teaches *Nostoc* (Ge-Xian-Mi) in a food product as well as colonies of size greater than 0.1 mm and about 10 mm. See Office Action at page 4. The Examiner further states that Qiu teaches that edible *N. commune* is of the same morphology and habitats as Ge-Xian-Mi and therefore, the reference anticipates the claimed subject matter. See *Id.*

The cultures of *Nostoc* described by Qiu are edible species grown in the mountain paddy fields in China. See Qiu, Abstract. Qiu further describes the “widespread use of

herbicides, pesticides and fertilizers” as an important factor in the limitation and endangered status of Ge-Xian-Mi. See *Id.* Further, the colonies of Ge-Xian-Mi harvested from the fields, while not uniform in size, may reach 0.5 to 2 cm in diameter. See Qiu at page 424, column 1-2. The colonies, when harvested, are not biologically pure as both grass and soil must be removed both after harvesting and again after drying. See Qiu at page 424, column 2; see also Fig. 2 (F-G) showing contaminants.

As described above, the colonies of Qiu are not biologically pure, nor axenic, as required by the claims as currently amended. Qiu describes that the colonies harvested from the fields are contaminated with dirt and grass and that the widespread use of herbicides, pesticides and fertilizers has endangered and even made extinct some areas where Ge-Xian-Mi is harvested. Colonies of *Nostoc*, according to the present invention, are substantially free of all of the above-listed contaminants. See Specification at page 7. Unlike the colonies disclosed by Qiu, the colonies of the present invention do not have to be washed or purified after harvesting as the colonies of *Nostoc* are grown, according to embodiments of the present invention, using a sterile medium. See Specification at page 8. Therefore, the food product produced from *Nostoc* colonies according to the present invention would be substantially free of all of the above mentioned contaminants, unlike the food product described by Qiu.

Furthermore, Qiu discloses that the colonies of Ge-Xian-Mi are not axenic as the soil samples from which the colonies are harvested contain elevated bacteria, actionmycetes and fungi levels as compared to soil samples that do not support the growth of Ge-Xian-Mi colonies. See Qiu at page 427, Table 2. Qiu also states that soil where Ge-Xian-Mi is present contained more microbes than soil lacking in Ge-Xian-Mi,

suggesting that higher concentrations of bacteria, actinomycetes and fungi are actually required to support the growth of the colonies. See Qiu at page 427, column 1. The *Nostoc* colonies of the current invention, as claimed in amended claim 41, are axenic, and therefore free of all other microorganisms.

As Qiu fails to teach biologically pure and axenic cultures of *Nostoc*, it can not anticipate currently pending claims 41 and 52. Applicants therefore respectfully request that the Examiner withdraw the rejection.

Rejections Under 35 U.S.C. § 103(a)

Claims 41–44, 52, and 67 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Hori *et al.* (Plant Foods for Human Nutrition, 1994) in view of Li *et al.* (“Li”) (Euro. J. Phycology, (2004), 39: 9-15) and Huang *et al.* (J. Phycology, 1998). Applicants traverse.

To establish a proper case of obviousness, one must apply the *Graham v. John Deere* factors. These factors include:

- (A) Determining the scope and contents of the prior art;
- (B) Ascertaining the differences between the prior art and the claims in issue;
- (C) Resolving the level of ordinary skill in the pertinent art; and
- (D) Evaluating evidence of secondary considerations.

See *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966).

Moreover, recently in the KSR case, regarding obviousness, the Court held

Often, it will be necessary . . . to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at

issue. To facilitate review, this analysis should be made explicit. See In re Kahn, 441 F. 3d 977, 988 (CA Fed. 2006) ([R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness).

See *KSR International Co. V. Teleflex Inc. et al.* 550 U.S. 398, 127 S. Ct. 1727, 1741 (2007).

When the *John Deere* factors and the holding in *KSR* are considered in light of the rejection presented, one can only conclude the instantly claimed invention is non-obvious for the following reasons.

The Examiner states that Hori teaches a soup and salad comprising *Nostoc commune* and the benefits of using *Nostoc* in food. See Office Action at page 5. The Examiner states that Hori does not teach the claimed colony size. Also, the Examiner asserts that Li teaches *Nostoc commune* as an edible cyanobacterium which grows in colony sizes ranging from 0.1 mm to about 10 mm. See Office Action at page 5. The Examiner notes that neither reference teaches colonies of *Nostoc* that comprise rhamnose and fucose. Therefore, the Examiner includes Huang and states that Huang teaches a biologically pure culture of *Nostoc* that comprises the monosaccharides rhamnose and fucose. The Examiner notes that none of the references teach the claimed amounts of *Nostoc* added to a food product. Nevertheless, the Examiner asserts that it would have been obvious to one of ordinary skill in the art to add a desired amount of *Nostoc* to a food product.

Claim 41 of the present invention, as currently amended, provides for food products comprising a biologically pure, axenic culture of *Nostoc* wherein at least 80% of the colonies of *Nostoc* are of uniform size between 3 mm and 5 mm. The benefits

derived from food products comprising biologically pure, axenic cultures of *Nostoc* wherein 80% of the colonies are of uniform size are the ability to produce large quantities of colonies without the cost of removing contaminants or other microorganisms. Uniform colonies are generated, according to embodiments of the present invention by the use of fluorescent light to synchronize the growth cycles of the *Nostoc* in order to generate a more uniform distribution of size. See page 11 of the written description. Furthermore, *Nostoc* colonies of the present invention contain the monosaccharides rhamnose and fucose as well as greater amounts of phycobiliproteins than are found in *Nostoc* colonies harvested from nature as cited in claims 67-68.

The soup and salad comprising *Nostoc commune* taught by Hori is derived from *Nostoc commune* that has been harvested from the wild and contains various contaminants, including dirt. The *Nostoc commune* taught by Hori is not biologically pure. Food products as claimed in claims 41-44, 52, and 67-68 are substantially free of contaminants, as described above. The Examiner asserts that Li makes up for the deficiencies of Hori in that it discloses *Nostoc commune* colonies ranging in size from 0.1 mm to 10 mm. However, Li describes colonies from *Nostoc sphaeroides*. The Examiner asserts that *Nostoc sphaeroides* are the same as *Nostoc commune*. However, Qiu treats these two species as different forms of *Nostoc*. See Qiu at page 427, Taxonomic identity of Ge-Xian-Mi. Furthermore, Huang, which the Examiner relies upon in rejecting the currently pending claims, also distinguishes between *Nostoc sphaeroides* and *Nostoc commune*. See Huang at page 963 at column 2 and Table 1 (showing differing monosaccharide profiles between *Nostoc sphaeroides* and *Nostoc commune*). Assuming *arguendo* *Nostoc sphaeroides* is the same as *Nostoc commune*, Li still fails to make up

for the deficiencies of Hori. While Li discloses *Nostoc sphaeroides* colonies of varying sizes, including 0.8 mm, 2 mm, 3 mm and 6 mm, Li was not concerned with producing uniform colonies of size between 3 mm and 5 mm for use in a food product, but rather the photosynthetic responses in colonies of varying sizes. One of ordinary skill in the art considering the disclosure of Li would not have been motivated to provide biologically pure, axenic cultures of *Nostoc* of uniform size in a food product. Moreover, in light of the teachings of Li, one would have no reason to provide biologically pure, axenic cultures of *Nostoc* of uniform size in a food product. Therefore, the combination of Hori and Li does not disclose a biologically pure culture of *Nostoc* wherein at least 80% of the colonies are of a uniform size between 3 mm and 5 mm. Additionally, Huang fails to make up for the deficiency of either Hori or Lee. Huang discloses colonies of *Nostoc commune* either harvested from the mountain area of Zouma of Hefeng County or grown in suspension. See Huang at page 963, column 1. The *Nostoc commune* cultures of Huang grown in suspension are not comparable to the uniform, biologically pure, axenic cultures of the present invention. Huang discloses *Nostoc commune* that is grown in suspension. As is recognized in the specification of the current invention, the growth of *Nostoc commune* in suspension does not provide conditions such that the *Nostoc commune* could form colonies, but rather only filaments. See specification at page 3. Therefore, "Huang fails to disclose any conditions that would allow the generation of colonies (either microcolonies or macrocolonies.)" *Id.* Huang fails to make up for the deficiency of biologically pure, axenic colonies that are not disclosed in either Hori or Li and, therefore, fails to render the claims, as currently amended, obvious.

As Hori, neither alone nor in combination with Li or Huang, teaches each and every element of claim 41, the Examiner has failed to present a *prima facie* case of obviousness. Similarly, the Examiner has failed to present a *prima facie* case of obviousness for claims 42–44, 52, and 67-68 as they depend from claim 41.

Withdrawal of the rejection is warranted and respectfully requested.

CONCLUSION

With the above amendments and remarks, Applicants believe that all objections and/or rejections have been obviated. Thus, each of the claims remaining in the application is in condition for immediate allowance. A passage of the instant invention to allowance is earnestly solicited.

Applicants respectfully petition for two months extension of time. Applicants believe that no fee beyond the extension fee and RCE fee is necessary, however, should an additional fee be deemed to be necessary, the Commissioner is hereby authorized to charge any fees required by this action or any future action to Deposit Account No. 16-1435.

Should the Examiner have any questions relating to the instant application, the Examiner is invited to telephone the undersigned at (336) 607-7442 to discuss any issues.

Respectfully submitted,

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